City of Lafayette Staff Report

For: Lafayette City Council

By: Steven Falk, City Manager
Jennifer Russell, Parks, Trails & Recreation Director

Date Written: May 30, 2008

Meeting Date: June 9, 2008

Subject: Community Center Roof Options

Introduction

During last year's budget discussions, staff reported that the Community Center roof is nearing the end of its useful life. Staff was directed to research roofing options and return to the Council with findings and a recommendation.

Given the wide range of roofing treatments and costs, staff thought it best to meet with roofing professionals and scheduled on site meetings with three roofing consultants. All three confirmed that the existing roof has served the Center well but is now in fair condition at best. Given the age of the roof, obvious signs of deterioration, and six or seven leaks over the winter, now is the time to replace it.

The City Council has long anticipated the need for a new roof at the Lafayette Community Center and, to that end, in 1996 established a sinking fund program in the annual budget for this purpose. $10,000 has been deposited into this fund for each of the last twelve years, and the Community Center Sinking Fund now has a balance of $120,000.

Background

The Community Center buildings at 500 St. Mary's Road were constructed more than 50 years ago. The property was used as a school for many years before being purchased by the City in 1984. In 1985, as part of the building rehabilitation effort, the City installed a new roofing system which, at the time, was estimated to have a 25 year service life.

The roofing system is a capsheet surfaced built-up roof, which – translated – means large asphaltic sheets over plywood, with hot tar used to seal the seams between the sheets. Penetrations through the sheets are typically not good for such roofs, and this roof has several penetrations, for skylights, vents, and the like. Sealants and flashings around the penetrations, however, have been relatively well maintained over the years, which has contributed to the extended life of the roof. There were, however, six or seven leaks during the past winter season.

The roof is not well insulated. Staff estimates that less than 40% of the building has attic space or any significant insulation; most of the rooms have open beam ceilings where the plywood/asphaltic sheets provide the only insulation. Some rooms have insulating material mounted to the ceiling tiles above the ceiling.

In March, the City received the final report by the ABAG / PG&E Energy Watch audit program, wherein those agencies evaluated energy use at the Community Center. This is the program that led to the replacement of all of the interior lighting fixtures. Regarding the roof, the Energy Watch auditors (HDR/Brown, Vence & Associates, Inc.) recommended that when replacing the roof, the City should install rigid insulation and a cool roof: "The roof's performance as a barrier against heat and cold can be improved by adding exterior insulation (rigid foam) under the roofing tiles and a cool roofing material on the outer surface." They estimated that doing so would save 6,200 kWh in electricity and 540 therms of natural gas annually, for an annual cost savings of $1,600 – not much given the large cost to replace the roof. "The payback would be long, largely because the building's hours of operation are relatively short and there is already some insulation in place above the ceiling tiles," in some areas.

So as to understand the City's options and what the structural implications for each of the options might be, the Parks, Trails and Recreation Director and the City Manager met with both roofing contractors and the firm Wiss Janney Elster Associates, Inc. (WJE), a structural engineering firm specializing in roof replacement.

Several options are summarized on the following pages.

Option 1: Restore Existing Roof

Estimated Cost: $115,000

Estimated Life: 10 years

- Strip asphalt shingles from roof
- Repair deteriorated plywood underlayment
- Install new asphalt shingles
- Reflash all turn up base flashings with new modified cap sheet.
- Reseal all metal edges, pipe penetrations, splits, ridges, and blisters with a three course application of mastic and webbing.
- Install gutter straps at 2' OC throughout the campus.
- Install 325 lineal feet of wire mesh gutter screen at selected areas near trees.
- Install and strip in lead jacks at pipe attachment locations.
- Apply two coats of reflective roof acrylic over the entire surface.

Pros	**Cons**
Would live within existing budget / sinking fund accumulation;	Does not include insulation upgrades recommended by auditors
Could be accomplished before next rainy season	Would not accommodate solar / PV generation
Does include reflective, "cool roof" coating which might lead to some savings	Not an attractive roof; no aesthetic upgrade

Option 2: Replace Existing Roof with Similar Built Up Roof

Estimated Cost: $175,000 to $250,000

Estimated Life: 25 years

- Remove roof
- Install new plywood underlayment
- Install new asphalt shingles
- Reflash all turn up base flashings with new modified cap sheet.
- Reseal all metal edges, pipe penetrations, splits, ridges, and blisters with a three course application of mastic and webbing.
- Install gutter straps at 2' OC throughout the campus.
- Install 325 lineal feet of wire mesh gutter screen at selected areas near trees.
- Install and strip in lead jacks at pipe attachment locations.
- Apply two coats of reflective roof acrylic over the entire surface.
- Remove and replace the existing roof with a new asphalt shingle roof.

Pros	**Cons**
Could be accomplished before next rainy season	Does not include insulation upgrades recommended by auditors
Does include reflective, "cool roof" coating which might lead to some savings	Would not accommodate solar / PV generation
	Not an attractive roof; no aesthetic upgrade

Option 3: Asphalt Shingle Roof System

Estimated Cost: $150,000 to $200,000

Estimated Life: 20 years

- Remove and replace the existing roof with a new asphalt shingle roof.

Pros	**Cons**
Could be accomplished before next rainy season	Does not include insulation upgrades recommended by auditors
Would represent an aesthetic upgrade	Would not accommodate solar / PV generation
Would have cool roof properties	Would require contribution from General Fund beyond sinking fund accumulation

Option 4: Standing Seam Metal Roof

Estimated Cost: $450,000

Estimated Life: 30 to 50 years

Hold off on replacing/renovating the roof for one year. Engage a roofing consultant to investigate the structural limits of the facility; make roof test cuts to verify the condition of the underlying layers; prepare a design that includes an option to integrate a Photo Voltaic power generation system into the rooftop systems.

The cost estimate does not include PV installation or additional structural investigation if roof cuts expose complex problems.

Pros	**Cons**
Metal roof would last for decades	Very expensive. Would require large contribution from General Fund beyond sinking fund accumulation
Roof would be designed to accommodate PV/solar panels	Would not be accomplished before next rainy season
Roof would be "green", with latest insulation and cool roof properties	
AC and other rooftop structures could be relocated to west side, enhancing aesthetics	
Would represent aesthetic upgrade	

Discussion

Staff has discussed these options with Councilmember Andersson, who noted that, for each option, the cost per year for the roof is approximately $10,000. That being the case, we believe that this becomes a question about the City's vision for the future of this building.

If, for instance, the City Council believes that the City will continue to occupy this facility, and that the buildings will stay as they are now configured for the next forty or fifty years, then it may make sense to now install a permanent metal roof with cool roof features, and with the ability to add solar PV technology in the future as it becomes more affordable.

If, on the other hand, the Council is unsure regarding the future of the existing facility, or otherwise believes that the buildings will be unusable or obsolete within twenty years, then it probably makes more sense to extend the life of the existing roof through either options 1 or 3.

Recommendation

Review Options and Direct Staff.

WJE | ENGINEERS
ARCHITECTS
MATERIALS SCIENTISTS

Wiss, Janney, Elstner Associates, Inc.
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Emeryville, California 94608
510.428.2907 tel | 510.428.0456 fax
www.wje.com

Via Email: SFalk@ci.lafayette.ca.us

May 6, 2008

RECEIVED
MAY 0 8 2008
CITY OF LAFAYETTE

Mr. Steven Falk
City of Lafayette
2675 Mt. Diablo Blvd., Suite 210
Lafayette, California 94549

Re: Lafayette Community Center
Proposal for Roofing Consulting
WJE No. 2008.2008

Dear Mr. Falk:

Wiss, Janney, Elstner Associates, Inc. (WJE) is pleased to present this proposal for roofing consulting at the Lafayette Community Center.

Background

The building at 500 St. Mary's Road in Lafayette, California, was constructed 50 to 60 years ago and was used as a school until the late 1970s. In 1980, the property was purchased by the City of Lafayette and converted from a school to a community center. The conversion included installation of a new roofing system, which at the time was expected to have a 25 year service life.

The roofing system is a capsheet surfaced built-up roof that is in good condition for its age. Refer to Figures 1 and 2. The capsheet has not suffered significant loss of granules. Roofing flashings are relatively well maintained, which contributes to the extended life of the roof. The only sign of possible systemic deterioration that was noted is low wrinkling and ridging. There were six or seven leaks in the 2007-08 rainy season, which reportedly were repaired. In summary, the roofing system has provided good service but it has been in service for a long time, so now is a prudent time to consider replacement.

The consideration of roofing replacement coincides with a desire to improve energy efficiency by adding insulation and possibly by adding photovoltaic (PV) panels to generate electrical energy. There is also an interest in improving the appearance of the roof, which currently has an industrial appearance.

Consulting on alternative energy tax credits and the design of PV panels is beyond the scope of WJE's service. We do, however, have some general comments. The California program of alternative energy tax credits that would benefit this project are set to expire at the end of this year. The extent to which such credits may be reduced or increased in the next California budget is beyond our knowledge. The building is oriented from northeast to southwest, so that the southeastern side of the pitched roof is relatively well oriented toward the sun. This side of the roof is not significantly shaded by trees or roof-top equipment. The southeastern half of the roof alone covers an area of approximately 14,000 square feet, which allows for a significant sized installation of PV panels. While a PV design professional will be needed to match the sun exposure to a PV system and to forecast the power that will be generated, it appears that it is wise to consider a PV system.

The City of Lafayette has invited WJE to propose services for the design of a new roofing system to address the needs outlined above. While there is an interest in examining the full range of options, we have structured our services to focus on a single system that we find best meets the City's needs in the context of what we learn about the building in our investigation. We are proposing to informally consult with City representatives on the development of the system rather than engage in a formal study of design alternatives for the purpose of limiting our fees for the project.

Proposed Scope of Services

Design Phase

We propose to begin our investigation by reviewing the limitations that the capacity of the structure may impose on reroofing options. For example, there may be a limit on the weight of a PV system that can be added to the roof. We will examine existing construction drawing and conditions at the site for this roofing-related structural investigation.

It is possible that this narrowly focused structural investigation may reveal other structural issues that require additional investigation, analysis, or corrective design. Such additional services are not included in this proposal.

Our initial investigation will include roof test cuts to determine the underlying layers of material. We will make temporary repairs with mastic and webbing. Permanent repairs by a licensed roofing contractor, which may be desired at some point, are not included in our proposal.

We will review alternative combinations of roofing and PV systems and meet with you to discuss available alternatives. Roofing and PV systems will be considered in combinations because the combined weight may be an issue and because of the need to flash penetrations associated with the PV system. For example, metal roofing (while more expensive than some kinds of roofing) allows attaching PV panels with clips to the roof's standing seams, thus minimizing roof penetrations and eliminating the weight of PV support frames.

Construction Documents Phase

Upon selection of an approach for the roofing system, we will provide construction drawings and specifications for the roofing system. We will provide a performance specification for the PV system. We do not anticipate that this project will necessitate ADA, accessibility, exiting, or other types of architectural upgrades. We anticipate that the City will provide its own Owner/Contractor agreement and conditions to the contract. We propose to provide bidding documents, administrative specification sections, technical specifications, and drawings.

We intend to rely upon the recommendations of a previously conducted energy audit to determine the R-value of the insulation to be specified. Depending on the economics of the PV system, we may propose moving all HVAC units to the road side of the building so that more roof area can be devoted to PV panels. If HVAC units need to be relocated or replaced, we plan to rely on the recommendations of the City's mechanical engineer or HVAC contractor. These mechanical engineering services are not included in our proposal. WJE's services do not include identification of hazardous materials or consulting on hazardous materials remediation. If the project requires hazardous materials consulting, we plan to rely on the City's consultant. Abatement design services are not included in our proposal.

We will consider PV systems alternatives from the perspective of the design of the roofing system. Considerations such as lifetime performance of particular panels and the process for obtaining tax credits are beyond our scope; however, we will work with the City and potential PV vendors to the extent that we can.

Bidding/Negotiation Phase

Our proposal includes participation in a pre-bid meeting, addressing bidder questions in one Addendum. We will consult with you to review submitted bids.

Construction Phase

Our proposal includes an allowance to participate in a pre-application meeting and eight progress meetings, process three payment applications, review submittals, and respond to four requests for information.

Project Team

WJE was founded in 1956, on the principle that delivering better solutions requires a better understanding of the problem. From the start, WJE has brought a hands-on technical approach, comprehensive testing capabilities, and an enthusiasm for problem solving to each construction challenge.

Our people are our strength. With more than 400 employees, WJE has the human resources to respond to virtually any problem, and expertise in all aspects of construction technology.

After half a century and more than 60,000 assignments, our engineers, architects, and materials scientists have successfully completed investigative, testing, and repair projects involving virtually every type of construction material, structural system, and architectural component. We are a recognized global leader in construction problem solving through our professional expertise, outstanding technical ability, and reputation for quick response to client needs.

For this project, the Project Manager will be Jim Strong and the Project Engineer will be Paul Cox. Summaries of the professional qualifications for these individuals are attached for your review.

Budget

WJE proposes to provide the services described above for the following budget amounts plus reimbursable expenses:

Design Phase	$12,038
Construction Documents Phase	$14,993
Bidding/Negotiation Phase	$1,595
Construction Phase	$16,247
Total	$44,873

We will provide the services described above billed hourly, plus reimbursable expenses. We will not exceed this Total amount without your prior approval. Services will be provided in accordance with our Standard Terms and Conditions, dated October 8, 2007, which are attached and are part of this proposal. This agreement may be terminated by either party upon not less than seven days written notice. The following is our current rate schedule:

Schedule of Hourly Time Charges

Professional Staff		**Professional Support Staff**	
Senior Principal	$260.00	Senior Specialist	$105.00
Principal	225.00	Specialist	95.00
Associate Principal	185.00		
Senior Associate	160.00	Senior Technician	$85.00
Associate III	145.00	Technician II	70.00
Associate II	120.00	Technician I	55.00
Associate I	100.00		

WJE is very interested in working on this project and would be glad to modify the scope of services as required to meet your needs. If this proposal is acceptable to you, please countersign and return a copy of the proposal.

Please feel free to contact us if you have any questions about this proposal or desire further information.

Sincerely,

WISS, JANNEY, ELSTNER ASSOCIATES, INC.

James C. Strong
Associated Principal

Agreed and Approved:

Name: _____(please print)

Signature: _____

Title: _____

As Agent or Principal for: _____

Date: _____

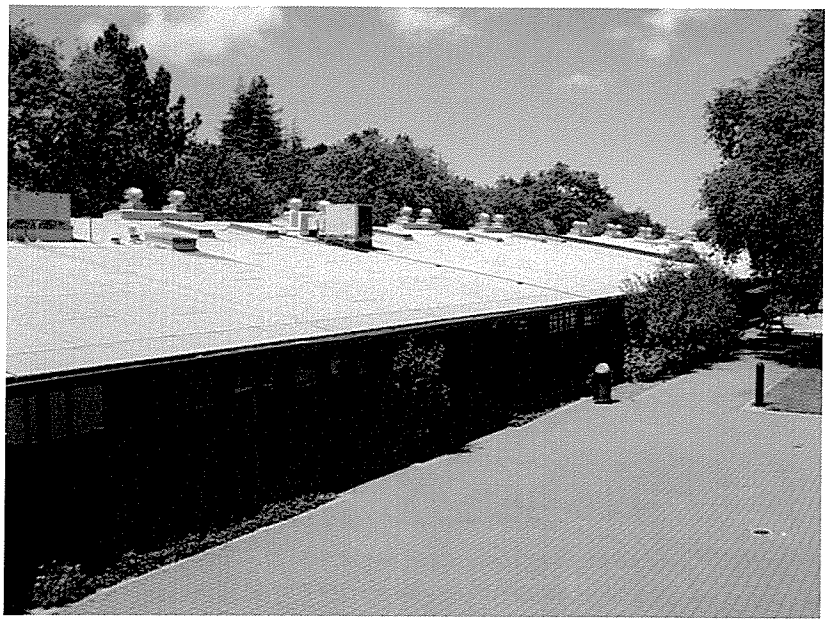

Figure 1. Overview of Community Center roof from the south.

Figure 2. Roof-top equipment, vents, and skylights.

WJE

STANDARD TERMS AND CONDITIONS

8 October 2007

These Standard Terms and Conditions shall continue in full force and effect during, and after the completion or termination of, Wiss, Janney, Elstner Associates, Inc. or WJE Engineers & Architects, P.C. (WJE) employment. These Standard Terms and Conditions shall control any conflicting term or condition unless WJE agrees otherwise in writing.

PERFORMANCE

WJE and its employees will exercise the degree of skill and care expected by customarily accepted practices and procedures. No warranties, expressed or implied, are made with respect to WJE's performance, unless agreed to in writing. WJE is not a guarantor of the project to which its services are directed, and its responsibility is limited to work performed for the client. WJE is not responsible for acts or omissions of the client, nor for third parties not under its direct control. WJE shall not be liable for any reason for any special, indirect or consequential damages including loss of use and loss of profit. WJE will take reasonable precautions to minimize any damage to the client's property during conduct of any WJE field work and testing. The client understands that in the normal course of this type of work some damage may occur, liability for which damage is not part of this agreement. WJE may rely upon information supplied by the client engaging WJE, or the contractors or consultants involved, or information available from generally accepted reputable sources, without independent verification. WJE services are being performed solely for client's benefit and no contractor, subcontractor, supplier, fabricator, manufacturer, tenant, occupant, consultant, or other third party shall have any claim against WJE as a result of its services.

WJE shall not have control over or charge of and shall not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and safety programs in connection with the project, since these are solely the responsibility of others. WJE shall not be responsible for the contractor's schedules or failure to carry out the project in accordance with contract documents. WJE shall not have control over or charge of acts or omissions of the contractor, subcontractor, or their agents or employees, or of any other non-WJE persons performing portions of the project.

USE OF REPORTS, DRAWINGS AND ELECTRONIC MEDIA

WJE retains ownership of letters, reports, drawings, specifications, photographs, test data, notes and other work product it has created. These documents or parts thereof may not be reproduced in advertisements, brochures, or sales material, nor used by the client for any purpose other than the purpose for which they were prepared, nor by third parties, without the written permission of WJE. Conclusions by WJE based on test results are limited to the specific conditions for which the tests were performed. In the event that WJE work product is stored or transmitted by some form of electronic media, the client agrees that WJE shall not be held liable for the completeness, transmission, accuracy or longevity of these materials, nor for misuse thereof.

PROPOSALS

Proposals expire 120 days after submission to a client unless a different expiration limit is included in the proposal. WJE may withdraw or modify a proposal at any time prior to acceptance by the client. All fees and expenses quoted in proposals or stated in invoices are exclusive (net) of local or county excise and other business or business license taxes. The client represents it is aware of all such taxes and shall reimburse WJE upon presentation by WJE of the cost of such taxes by an invoice within one year of completion of services.

CLIENT DUTIES

In order for WJE to perform the services requested, the client shall, at no expense to WJE, (1) provide all necessary information regarding client's requirements as necessary for orderly progress of the work, (2) designate in writing a person to act as client's representative for services to be rendered under this Agreement, which person shall have authority to transmit instructions, receive instructions and information, interpret and define client's policies and requests for WJE's services, and (3) provide access to and make all provisions for WJE to enter, without cost, limitation or burden to WJE, publicly or privately owned property as required to perform the work, including the use of scaffolds or similar mechanical contrivances.

SAFETY

Field work of WJE will be performed only under conditions deemed safe by WJE personnel. Charges may be made for safety or security measures required by hazardous job conditions. WJE is not responsible for the safety of other persons or property.

HAZARDOUS MATERIALS

If WJE encounters, or reasonably suspects that it has encountered, hazardous materials in the project, WJE shall cease activity on the project and promptly notify the client. The client shall initiate action, where appropriate, to identify and investigate the nature and extent of hazardous materials in the project and to abate and/or remove the same as may be required by federal, state or local statute, ordinance, code, rule, or regulation now existing or hereinafter enacted or amended. Unless otherwise specially provided in writing, the services to be provided by WJE do not include identification of hazardous materials, and WJE has no duty to identify or attempt to identify the same within the area of the project.

It is further understood and agreed that services WJE will undertake for the client may be uninsurable obligations involving the presence or potential presence of hazardous materials. Therefore, the client agrees, except (1) such liability as may arise out of WJE's sole negligence in the performance of services under this agreement or (2) to the extent of insurance coverage available for the claim, to hold harmless, indemnify and defend WJE and its employees, subcontractors and agents from and against any and all claims, lawsuits, damages, liability and costs, including but not limited to, costs of defense, arising out of or in any way connected with the presence, discharge, release, or escape of hazardous materials. This indemnification applies only to existing conditions and not to conditions caused or

created by WJE. "Hazardous materials" includes, but is not limited to, any substance, waste, pollutant (including mold and mildew) or contaminant, in whatever form, now or hereafter included with such terms under any federal, state or local statute, ordinance, code, rule or regulation now existing or hereinafter enacted or amended.

SUSPENSION OF SERVICES

If the client fails to make payment when due for WJE's services and expenses, WJE may, upon seven days' written notice to the client, suspend performance of services under this Agreement. Unless payment in full is received by WJE within seven days of the date of the notice, the suspension shall take effect without further notice. In the event of a suspension of services, WJE shall have no liability to the client for delay or damage caused the client because of such suspension of services.

FIXED PRICE CONTRACTS

Where WJE and the client have agreed to a fixed price contract, the following WJE Standard Terms and Conditions are specifically excluded: Time Charges, Expenses, Equipment Usage, Affiliated Consultants, and Subcontracted Services. Progress payments will be made monthly as a percent of completion unless otherwise arranged with the client. Other WJE Standard Terms and Conditions stated herein remain in effect.

TIME CHARGES

Time charges are accrued on an hourly basis, unless other arrangements are established. Minimum time charges for personnel at a job site are 8 hours per day, unless time can be utilized on another job. Hourly rates are not increased for overtime. Billing rates may be increased annually.

EXPENSES

Public transportation, subsistence and out-of-pocket expenses incurred during travel, communications, reproduction and shipping charges will be billed at cost plus 5% (invoiced as an expense service fee.) Use of company or personal vehicles is billed at $0.60 per mile.

Expended materials for field and laboratory investigations, rental equipment, and fees advanced on client's behalf will be billed at cost plus 10% (invoiced as an expense service fee.)

Clients may be charged for the cost of providing copies of receipts or detailed "back-up" information concerning expenses.

EQUIPMENT USAGE

WJE equipment used in field or laboratory work is billed at approximately 1% of the replacement cost per day, subject to adjustment for minimum or extended usage.

AFFILIATED CONSULTANTS

WJE retains certain affiliated consultants as independent contractors. These affiliated consultants are billed at rates equivalent to WJE employees of similar education and professional experience.

STORAGE

Material samples not consumed in WJE's work will be discarded 30 days after completion of the project unless the client requests other disposition. Charges will be made for extended storage of materials, records, or equipment. WJE will exercise reasonable care in safeguarding materials, records, or equipment, but disclaims any liability for loss or damage.

SUBCONTRACTED SERVICES

Services are billed at cost plus 10% if the subcontracted firm has at least $500,000 of Professional/General Liability Insurance, otherwise cost is marked up 20%.

SUBPOENAS AND COURT ORDERS

The client is responsible, after notification, for payment of time charges, attorney fees and other expenses resulting from a required response to subpoenas or court orders issued at the request of any party concerning any part of WJE's work. Charges are based on billing rates in effect at the time of WJE's response.

DISPUTE RESOLUTION

Any dispute that should arise between the client and WJE shall first try to be resolved through mediation. The mediator shall be mutually agreed upon and chosen from a list provided by the American Arbitration Association or other source of experienced professional mediators.

INSURANCE

WJE is protected for general, automobile, workers' compensation and employers' liability coverage by policies written by national insurance carriers rated by the A.M. Best Company. The primary limits are $1,000,000 with a $5,000,000 aggregate on general liability. Excess coverage applies to exposures over $1,000,000. Endorsements are not allowed. Coverage is subject to annual renewal. Increased coverage will be sought if requested. Charges for additional coverage will be billed to the client.

BILLING TERMS

The firm or individual engaging WJE is responsible for payment of charges unless WJE is notified in writing, prior to the time that the charges are incurred, that the engagement is on behalf of another party. Accumulated charges will be billed in approximately monthly intervals. State and local sales and use tax will be included in the billing if applicable. Payment in full (in US dollars) is due upon receipt of the invoice. Invoices which are unpaid 30 days from the invoice date are considered past due and subject to an interest charge at the rate of 1 1/2% per month (or at a lower maximum legal rate) plus related attorneys' fees and collection expenses. The client is responsible for payment of all charges. Agents of the client who engage WJE are also responsible for payment of all charges unless WJE agrees otherwise in writing prior to the time that the charges are incurred.

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WJE | ENGINEERS ARCHITECTS MATERIALS SCIENTISTS

James C. Strong

Associate Principal

EDUCATION

Michigan State University
Bachelor of Arts, Communications, 1970

PRACTICE AREAS

Leakage Investigation
Historic Preservation

EXPERIENCE

Mr. Strong joined WJE in 2000, bringing to the firm two decades of experience in building envelope technology. His primary responsibilities are investigating and developing repair designs for water leakage in existing structures, which range from high-rise office and residential buildings to single-family residences.

Mr. Strong has extensive experience investigating and solving water leakage problems for a range of building components including: roofing; plaza and parking deck waterproofing systems (fluid-applied, single-ply, and built-up); facades (stucco, EIFS, stone, and wood siding); windows; and below-grade walls.

Mr. Strong is experienced in both field and laboratory testing of waterproofing materials' performance. He has also focused on interior moisture problems including condensation and flooring failures associated with floor slab moisture. In addition, he has investigated and developed repairs for deteriorated concrete walls, including historic architectural concrete. Prior to joining WJE, Mr. Strong held various leadership positions at Oakland-based Testing Engineers, Inc., an inspection, testing, and materials engineering firm.

REPRESENTATIVE PROJECTS

Exterior Wall Systems

- County Hospital: Investigated leakage in windows, stucco, and curtain wall. Designed repairs for stucco and windows, Oakland, CA
- Grace Cathedral: Represented owner in design-build historic restoration of deteriorated architectural concrete, metal roofs, and faceted stained glass windows, San Francisco, CA
- SFSU Humanities Bldg: Investigated leakage in EIFS wall/window systems; designed repair scope used to estimate cost, San Francisco, CA

Flooring Material Failures

- Best Buy store: Investigated carpeting problems, Dublin, CA
- UCSF Laboratory: Investigated sheet vinyl flooring problems and reviewed repairs. San Francisco, CA
- Vasco Business Center: Designed repairs including replacing vinyl tile and adding exterior drainage, Livermore, CA

Roofing and Waterproofing

- 12100 Wilshire: Designed repairs for 6-level below-grade parking structure and planter waterproofing replacement, Los Angeles, CA
- Basketball Court at Residence: Investigated leakage in below-grade walls and repairs, Lake Oswego, OR
- Clorox Headquarters: Designed seals for seismic separation joints at plaza and roof locations, and designed repairs for plaza leaks, Oakland, CA
- Medical Laboratory: Designed re-roofing and re-cladding for pre-engineered steel building, Berkeley, CA.
- New Orleans Convention Center: Investigated roofing and exterior wall storm damage, utilized infrared scanning and designed repair for settlement of insurance claim, New Orleans, LA
- SFSU Residence Apartment Building: Investigated leakage at roofs and designed repair used to estimate cost, San Francisco, CA

PROFESSIONAL AFFILIATIONS

ASTM International (ASTM)
International Concrete Research Institute (ICRI)
Western Construction Consultants (WESTCON)

TECHNICAL COMMITTEES

ASTM C24 - Building Seals and Sealants
ASTM D08 - Roofing and Waterproofing

WJE | ENGINEERS
ARCHITECTS
MATERIALS SCIENTISTS

Paul E. Cox

Associate Principal

EDUCATION

San Francisco State University
Bachelor of Science, Civil Engineering, 1985

REGISTRATION

Civil Engineer in California

PRACTICE AREAS

Concrete Deterioration
Construction Claims Investigation
Historic Preservation
Repair and Rehabilitation Design
Seismic Damage Assessment
Structural Investigation

EXPERIENCE

Since joining WJE in 1985, Mr. Cox has investigated hundreds of structures with design, construction, and materials defects. He has investigated structural and non-structural damage due to fire, water, or thermal stresses; and evaluated damage due to excessive loading from vehicles, wind, earthquake, water ponding, and explosion. His experience includes the evaluation and design of repairs for timber, concrete, masonry, and steel buildings of all sizes, with particular expertise in building envelopes. He also has extensive experience in evaluating and restoring historic structures, and has performed standard and non-standard testing of materials.

Mr. Cox has on numerous occasions been an expert witness in litigation involving structural and building envelope issues.

REPRESENTATIVE PROJECTS

Structural Investigation

- Morgan Hill Water Tank: Investigation and repair design of underdesigned 1.2 million gallon concrete water storage tank, Morgan Hill, California
- 24-Hour Nautilus: Cause and origin investigation of collapsed wood-truss roof, San Jose, California
- Los Gatos Auto Row: Safety evaluation and shoring design of explosion-damaged building, Los Gatos, California
- Grace Cathedral Carillon: Evaluation and repair design of corroded carillon structural steel frame, San Francisco, California

Seismic Damage Assessment

- Harmon Business Park: Seismic damage assessment of 1.4 million square foot manufacturing and office campus with five tilt-up or cast-in-place concrete buildings, Northridge, California

Concrete Deterioration

- Golden Gateway Center: Investigation and repair design of the facades of four 25-story concrete apartment buildings, San Francisco, California
- Palo Alto Office Center: Investigation and repair design of 17-story concrete facade, Palo Alto, California

Construction Claims Investigation

- Harbor Lofts: Investigation and repair design of facade for 46-unit brick, steel, and EIFS condominium project, San Francisco, California

Historic Preservation

- Alcazar Theater: Investigation, repair and preservation design, and seismic stabilization for historic terra cotta facade, San Francisco, California
- Hebern Building: Investigation, repair and preservation design, and seismic stabilization for historic terra cotta facade, Oakland, California

PROFESSIONAL AFFILIATIONS

American Architectural Manufacturers Association (AAMA)
American Concrete Institute (ACI)
ASTM International (ASTM)
American Society of Civil Engineers (ASCE)
International Concrete Research Institute (ICRI)
Structural Engineers Association of California (SEAOC)

TECHNICAL COMMITTEES

ASTM D07 - Wood
ASTM E06 - Performance of Buildings